JACC: CARDIOVASCULAR INTERVENTIONS
VOL. 8, NO. 14, 2015

ISSN 1936-8798/$36.00
PUBLISHED BY ELSEVIER INC.
http://dx.doi.org/10.1016/j.jcin.2015.07.032

IMAGES IN INTERVENTION

Not Your Typical Hole-in-the-Wall

Percutaneous Closure of an Acquired Post-Myocardial Infarction Ventriculoatrial Gerbode Defect

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A 58-year-old male patient presented with an inferior ST-segment elevation myocardial infarction complicated by a ventricular septal defect (VSD). The VSD was surgically repaired, but basal extension of necrotic tissue obligated a second repair 2 weeks later. Subsequently, he again presented in cardiogenic shock and was found to have a significant residual VSD; he was referred to our institution for cardiac transplantation.

Transthoracic echocardiogram showed further basal extension of the VSD (Figure 1A) with left ventricular (LV) to right ventricular shunting. However, transesophageal echocardiogram instead revealed LV to right atrial (RA) shunting through an 11-mm Gerbode defect with direct extension through the atrioventricular portion of the septum, which was thought to be from further basal extension of infarct necrosis (Figure 1B). Percutaneous closure was planned, as a third sternotomy could preclude future transplantation listing.

Shunt run demonstrated elevated RA pressures, with a-wave 24 mm Hg and v-wave 28 mm Hg. Shunt size was estimated at 4.57 l/min (Qp/Qs 1.72). With a retrograde transfemoral approach and directed by an internal mammary catheter, a coated guidewire was advanced through the defect into the RA, where it was snared and externalized through the internal jugular vein (Figure 1C). A delivery sheath was advanced over the guidewire from the neck into the LV and ascending aorta (Figure 1D), and a 14-mm Amplatzer atrial septal occluder (St. Jude Medical, St. Paul, Minnesota) was successfully deployed with minimal residual shunting (Figures 1E to 1G) and an immediate 4-mm Hg improvement in mean RA and right ventricular pressures. Shunt size was reduced to 2.18 l/min (Qp/Qs 1.37) with residual shunting through the device itself, which was expected to improve with endothelialization. Tricuspid valve leaflets were free from impingement after device deployment as assessed by transesophageal echocardiogram with no significant regurgitation. The patient was successfully discharged and was stable at 2-month follow-up.

Acquired Gerbode defects are rare, and percutaneous closure has only previously been described in 3 cases of surgically acquired defects (1-3) but not after myocardial infarction. In this case, successful percutaneous closure allowed for immediate hemodynamic and clinical stabilization and the avoidance of a third sternotomy, which may have excluded the option of cardiac transplantation in the future.

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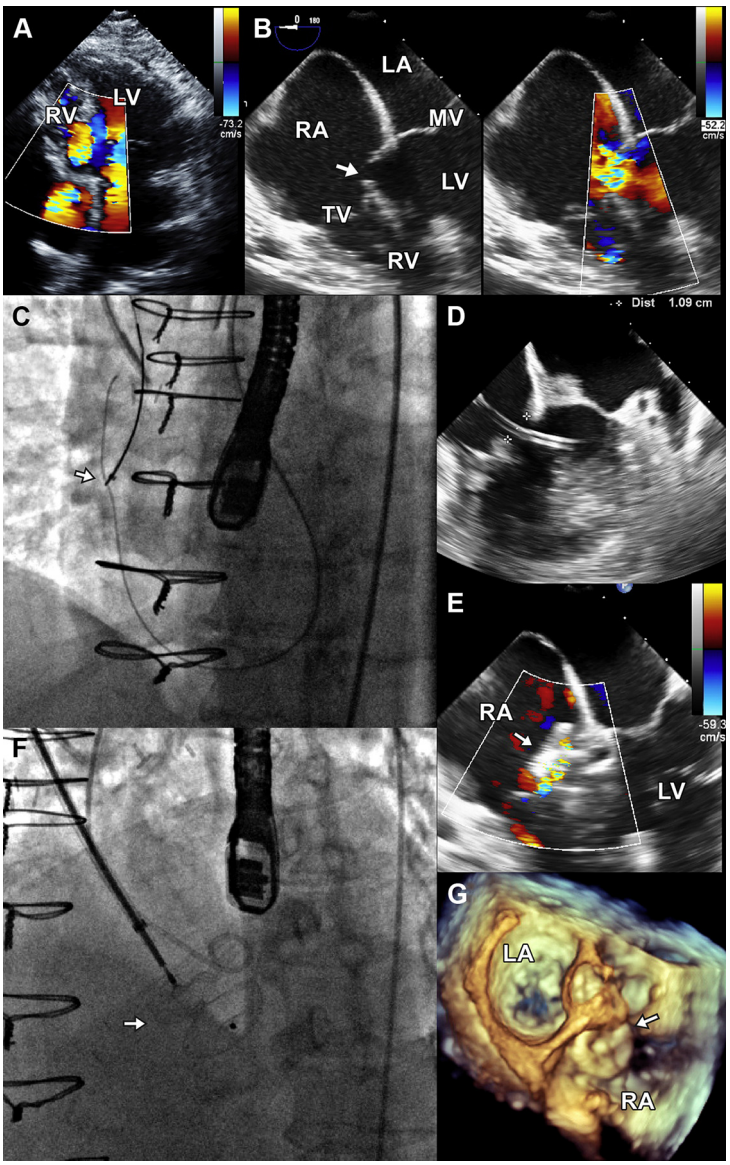
Manuscript received May 28, 2015; revised manuscript received June 25, 2015, accepted July 2, 2015.

FIGURE 1 Echocardiographic and Fluoroscopic-Guided Percutaneous Closure of a Gerbode Defect



(A) Apical 4-chamber view on transthoracic echocardiogram of shunting from the left ventricle (LV) to what appears to be the right ventricle (RV). **(B)** Midesophageal 4-chamber view on transesopahgeal echocardiogram instead reveals a Gerbode defect **(arrow)** to the right atrium (RA). The left atrium (LA), mitral valve (MV), and tricuspid valve (TV) are also shown. **(C)** Cranial left anterior oblique view on angiogram shows a guidewire being snared **(arrow)**. **(D)** An Amplatzer delivery sheath across the 11-mm defect. **(E and F)** An Amplatzer 14-mm atrial septal occluder **(arrow)** is deployed with minimal residual shunting. **(G)** 3-dimensional transesophageal echocardiogram shows no residual defect and a well-situated device **(arrow)**.

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KEY WORDS Amplatzer septal occluder device, interventional heart failure, ventricular septal defect